ALTO®

CLARKE TECHNOLOGY

IMAGE 16
120V

Section II
Parts and Service Manual

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AUTHORIZED PERSONNEL MAINTENANCE

To Access Pump Motor

1. Remove brush housing from machine. See "Brush Motor Repair".
2. Remove pump ground wire from ground screw.
3. Disconnect pump electrical wires form machine harness.
4. Remove solution hoses by turning swivel nut counter clockwise.
5. Remove four (4) mounting screws that secure pump motor to solution tank.
6. Reverse procedures for installing new pump. Check wiring diagram for proper connections when reinstalling electrical parts.

Solenoid/Spray Valve Removal

1. Loosen screw in rear plate that secures recovery tank to machine.
2. Raise and tilt recovery tank to the side.
3. Disconnect electrical lead from solution valve.
4. Disconnect solenoid from brush housing by press quick disconnect coupling on top of brush housing.
5. Remove hoses by loosening hose clamps and pull hoses from solenoid valve.
6. To reinstall, reverse procedure. Check wiring diagram for proper connections when reinstalling electrical parts.

Brush Motor Repair

1. Tilt machine on handle or place machine upside down.
2. Pull brush adjustment rod out of adjustment holes.
3. Remove brush stop bracket by removing two (2) screws.
4. Remove two (2) brush pivot shoulder screws (3/16" Allen Wrench) from sides of solution tank.
5. Pull brush housing away from solution tank far enough to access wiring .
6. Disconnect wiring and place brush housing on bench.
7. Remove bottom plate by removing nine (9) 10-32 screws.
8. Remove motor and reverse procedure to reinstall.
9. Check wiring diagram for proper connections when reinstalling electrical parts.

Brush Drive Belt Replacement

1. Tilt machine on handle or place machine upside down.
2. Remove bottom brush plate.
3. Remove pivot screw on drive sprocket side.
4. Remove drive sprocket and replace belt.
5. Reassemble in reverse order.

Maintenance of the Vacuum Motor

This machine has a vacuum motor that uses carbon brushes. The carbon brushes in the motor must be checked every three months, or every 500 hours of operation, whichever comes first. If either of the brushes is shorter than 3/8 inch, replace both of the carbon brushes.

To gain access to the vacuum motor:

1. Remove one (1) screw in rear plate that secures recovery tank to machine.
2. Raise and tilt recovery tank.
3. Can now access the brushes or the three (3) bolts that secure the vacuum motor to tank.

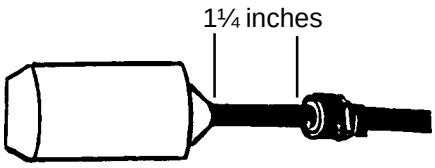


Figure 1

Replacement of float switch

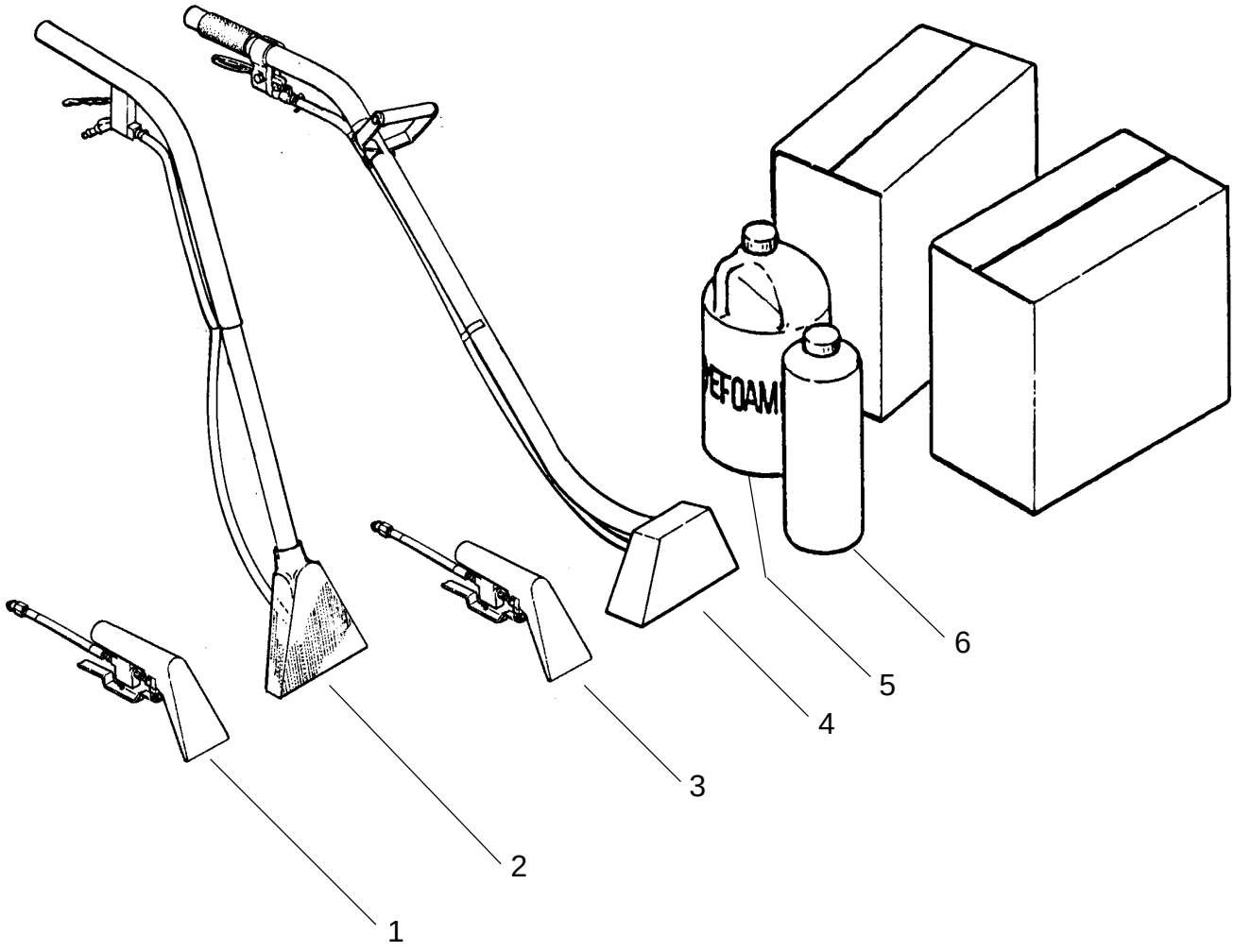
1. Install and tighten strain relief onto float cord. See fig. 1.
2. Install new o-ring seal onto strain relief.
3. Install replacement float with strain relief through inside wall of recovery tank.
4. Tighten strain relief.
5. Check wiring diagram for proper connections and check fittings for leaks.
6. Check float switch for proper operation and shut off capacity.

Brush Maintenance (See page 35 for parts references)

1. Tilt machine on handle or place machine upside down.
2. Remove one screw from each side (ref. #5 and #33 on page 35) of the brush housing.
3. Remove one screw (ref. #15 on page 35) from brush retainer strap (ref. #19 on page 35) and rotate strap so that brush can be removed.
4. Remove brush.
5. **Carefully** pry brush pivot out from bearing (applying pressure unevenly can break brush pivot).
6. Add a small amount of grease to face of seal and bearing on I.D. of brush core.
7. Reassemble in reverse order.

HOW TO CORRECT PROBLEMS IN THE MACHINE

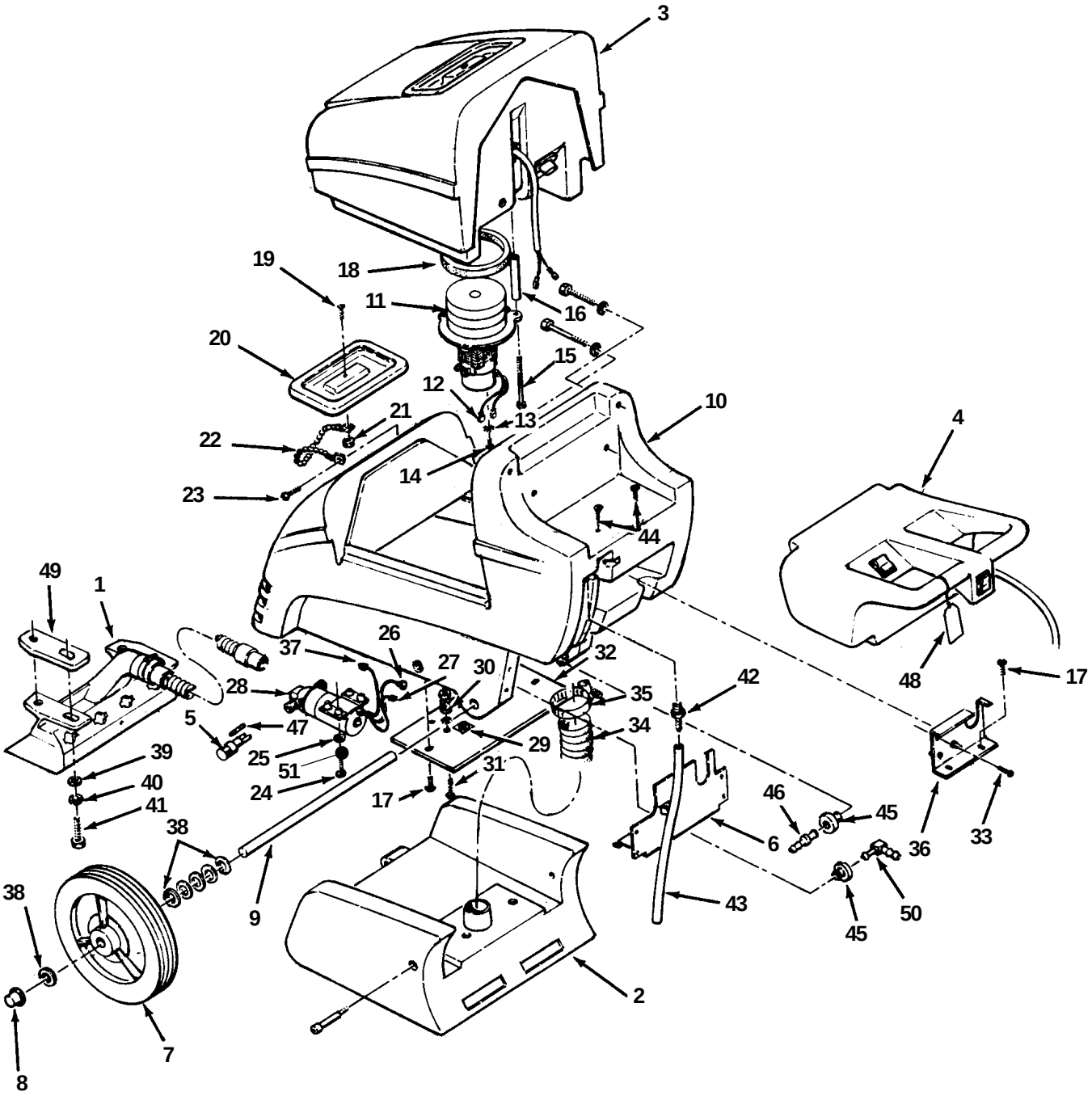
PROBLEM	CAUSE	ACTION
The machine will not run.	1. Machine does not have power...	1. Make sure the machine is connected to the correct frequency and voltage, and all connections are tight.
There is no suction.	1. Vacuum motor may not be running... 2. Vacuum/accessory motor switch may be defective. 3. There may be a loose motor connection.. 4. There may be an obstruction in the vacuum hose.... 5. Motor brushes may be worn... 6. Drain valve may be open... 7. Dome gasket may be worn or damaged... 8. Vacuum hose may be damaged... 9. Vacuum intake screen clogged...	1. Be sure the vacuum/accessory switch for the vacuum motor is at the “ON” position. 2. Contact an authorized service person. 3. Contact an authorized service person. 4. Remove the obstruction. 5. Replace the motor brushes. 6. Close the drain valve. 7. Replace the gasket. 8. Replace the hose. 9. Remove and clean lint screen on vacuum stand pipe.
Uneven or no spray from the jets.	1. The spray/brush switch may be defective... 2. The spray tips may be dirty, plugged or worn... 3. The hose may be kinked...	1. Turn the switch to "I". 2. Clean or replace the tips 3. Inspect the hose.
The drain valve leaks.	1. The drain valve gaskets may be worn or damaged... 2. There may be lint or dirt in the drain valve...	1. Replace the gaskets. 2. Clean or replace the drain valve.
The solution pump runs but no solution comes out of the spray nozzle	1. The spray tips may be plugged... 2. The spray solenoid may be damaged... 3. The solution screen may be plugged... 4. The pump may be worn... 5. The hose may be kinked...	1. Clean the spray tips. 2. Replace spray solenoid. 3. Clean or replace the nozzle. 4. Contact an authorized service person. 5. Inspect the hose.
The solution pump leaks.	1. There may be a faulty seal in the pump... 2. The pump may be worn...	1. Contact an authorized service person. 2. Contact an authorized service person.
The float switch may not be shutting off or turning on.	1. The switch may be damaged...	1. Contact an authorized service person.
Brush motor doesn't run.	1. Circuit breaker tripped... 2. Switch is bad... 3. Motor is bad....	1. Reset circuit breaker. 2. Contact an authorized service person. 3. Contact an authorized service person.



Item	Part No.	Description	Qty
1	59231A	RM-4P Tool Assembly	1
2	59230A	RM-8P Tool Assembly	1
3	59228A	RM-4M Tool Assembly	1
4	59229A	RM-12M Tool Assembly	1
5	398420	Defoamer	*1 case
6	398421	Extractor, Concentrate	*1 case

*12 , 1 quart bottles

CLARKE TECHNOLOGY Image 16i/ix
Drawing Final Assembly 4/99



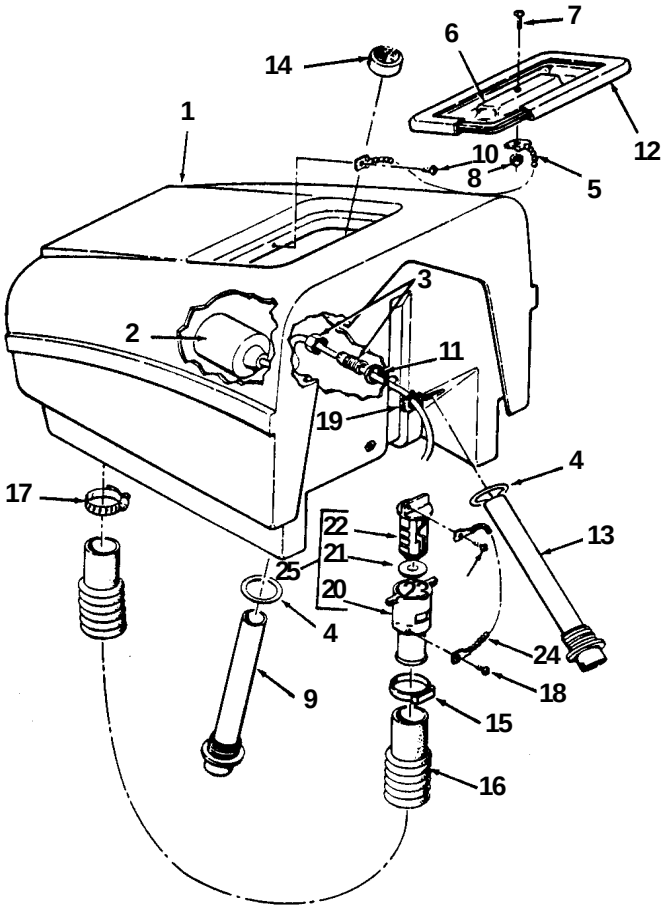
CLARKE TECHNOLOGY Image 16i/ix
Parts List, Final Assembly 4/99

Ref.	Part No.	Description	Qty	i	ix
1	Page 38	Asm., Recovery Shoe	1	x	x
2	Page 35	Asm., Brush Housing	1	x	x
3	Page 34	Asm., Recovery Tank	1	x	x
4	Page 36	Asm., Electrical Panel	1	x	
	Page 37	Asm., Electrical Panel	1		x
5	912201	Fuse Holder	1	x	x
6	Page 39	Asm., Valve Support	1	x	x
7	59947A	Wheel	2	x	x
8	920346	Nut, PAL	2	x	x
9	67463A	Axle	1	x	x
10	38996B	Tank. Solution(incl. #'s 45,46,50)	1	x	x
11	44911R	Motor, Vac, 3 Stage	1	x	x
12	47708A	Terminal, Male, Q.D.	2	x	x
13	980603	Washer, Lock	3	x	x
14	962546	Screw, 10-24 x ½	1	x	x
15	85736A	Screw, ¼-20 x 3.75 Hx	3	x	x
16	58533A	Spacer, 3 1/16 Lg. Plastic	3	x	x
17	84237A	Screw, 10-32 x ½	4	x	x
18	643418	Gasket	1	x	x
19	962798	Screw, 10-24 x ½	1	x	x
20	832322	Cover, Solution Tank	1	x	x
21	81110A	Nut, 10-24	1	x	x
22	692409	Chain, Cover	1	x	x
23	85519A	Screw, ¼-20 x 3/8	1	x	x
24	962113	Screw, 10-32 x 1	4	x	x
25	980982	Washer, Plain	4	x	x
26	911933	Terminal, Clip #10 Ring	1	x	x
27	47905A	Terminal, ¼ FIMQD*	1	x	x
28	45905C	Pump, 100 psi 120V	1	x	
	45928A	Pump, 100 psi, Bypass	1		x
29	77094A	Label, Ground Symbol	1	x	x
30	920224	Nut, 10-32	2	x	x
31	85383A	Screw, 10-32 x 3/4	1	x	x
32	68779A	Cover, Bottom	1	x	x
33	85395A	Screw, ¼-20 x ½	1	x	x
34	674110	Hose, Exhaust	1	x	x
35	872010	Clamp Hose	2	x	x
36	Page 39	Assembly,Plate, Rear Cover	1	x	x
37	47711A	Terminal, ¼ FIFQD**	1	x	x
38	87607A	Washer, Flat Nylon	12	x	x
39	980651	Washer, 5/16 Flat	4	x	x
40	980652	Washer, 5/16 Lock	4	x	x
41	85813A	Screw, 5/16 - 18 x1	4	x	x
42	53619A	Adapter, 3/8 Barb x ¼ NPT Nylon	1	x	x
43	59322A	Hose, Clear 3/8 x 23"	1	x	x
44	171112	Screw, ¼-20 x ½	2	x	x
45	51518A	Bushing	2	x	x
46	52414A	Connector	1	x	x
47	42911A	Fuse, 1.25A	1	x	x
48	699203	Tag, Caution	1	x	x
49	67897A	Spacer, Recovery, Tool	2	x	x
50	51526A	Bushing Drain	1	x	x
51	980650	Washer	4	x	x
NI	699202	Cable, Tie	9	x	x
NI	14608A	Literature Kit	1	x	x

Accessories: Part No. 77275A - Label Operating Instructions

*FIMQD=Fully Insulated Male Quick Disconnect
**FIFQD=Fully Insulated Female Quick Disconnect

CLARKE TECHNOLOGY Image 16i/ix
Drawing & Parts List, Recovery Tank Assembly 2/99
Form #19183A



Ref.	Part No.	Description	Qty
1	38982C	Tank, Recovery	1
2	47419A	Switch, Float	1
3	56459A	Strain, Relief	1
4	837304	O'Ring	2
5	692409	Chain	1
6	832322	Cover, Solution Tank	1
7	962798	Screw, 10-24 x ½	1
8	81110A	Nut, 10-24	1
9	39326A	Tube, Vacuum	1
10	85519A	Screw, ¼-20 x 3/8	1
11	59877A	Washer, ½ NPT Sealing	1
12	34256A	Gasket, Cover	1
13	39327A	Tube, Recovery	1
14	56476A	Strainer	1
15	832002	Clamp, Plastic	1
16	30431A	Hose, Recovery	1
17	752020	Clamp, Hose	1
18	962943	Screw, 8-18 x ½	1
19	82100A	Lock Nut, ½ Conduit	1
20	839401	Drain, Valve	1
21	833407	Gasket, Drain	1
22	833901	Handle, Drain, Valve	1
23	962987	Screw, 10-24 x 3/8	1
24	52206A	Chain	1
25	839410	Vavle Assembly	ref.

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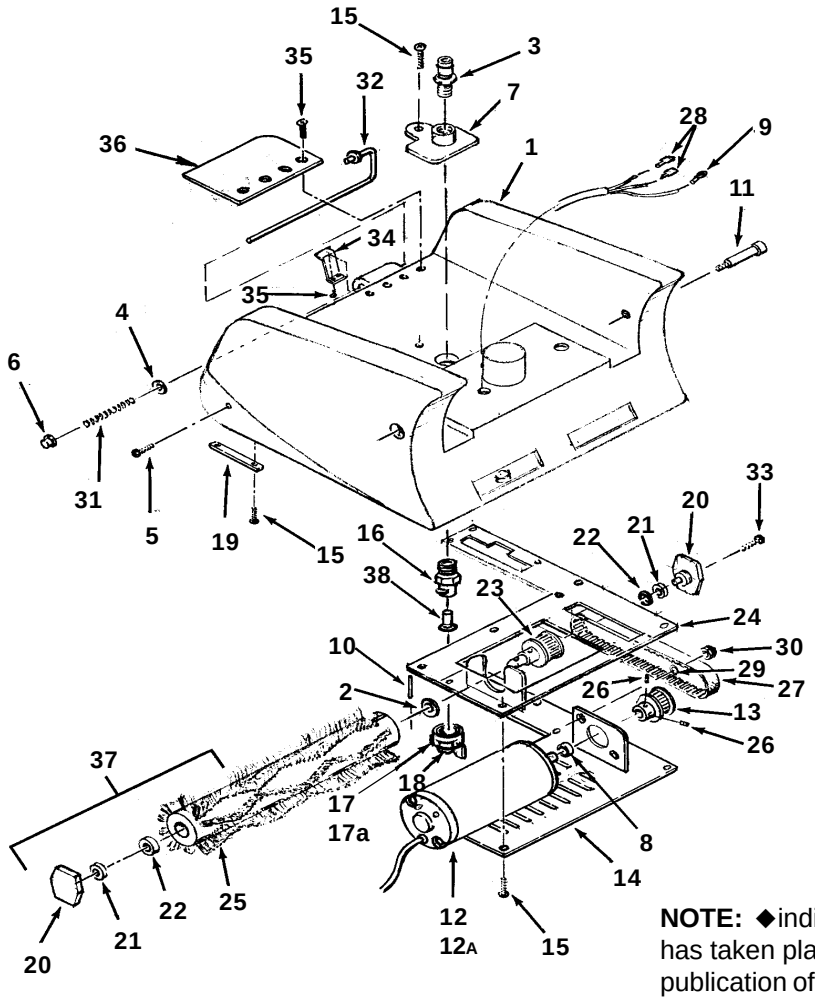
Drawing and Parts List, Brush Housing Assembly 5/01
Form #15718A



NOTE: ◆indicates a change has taken place since last publication of this manual.

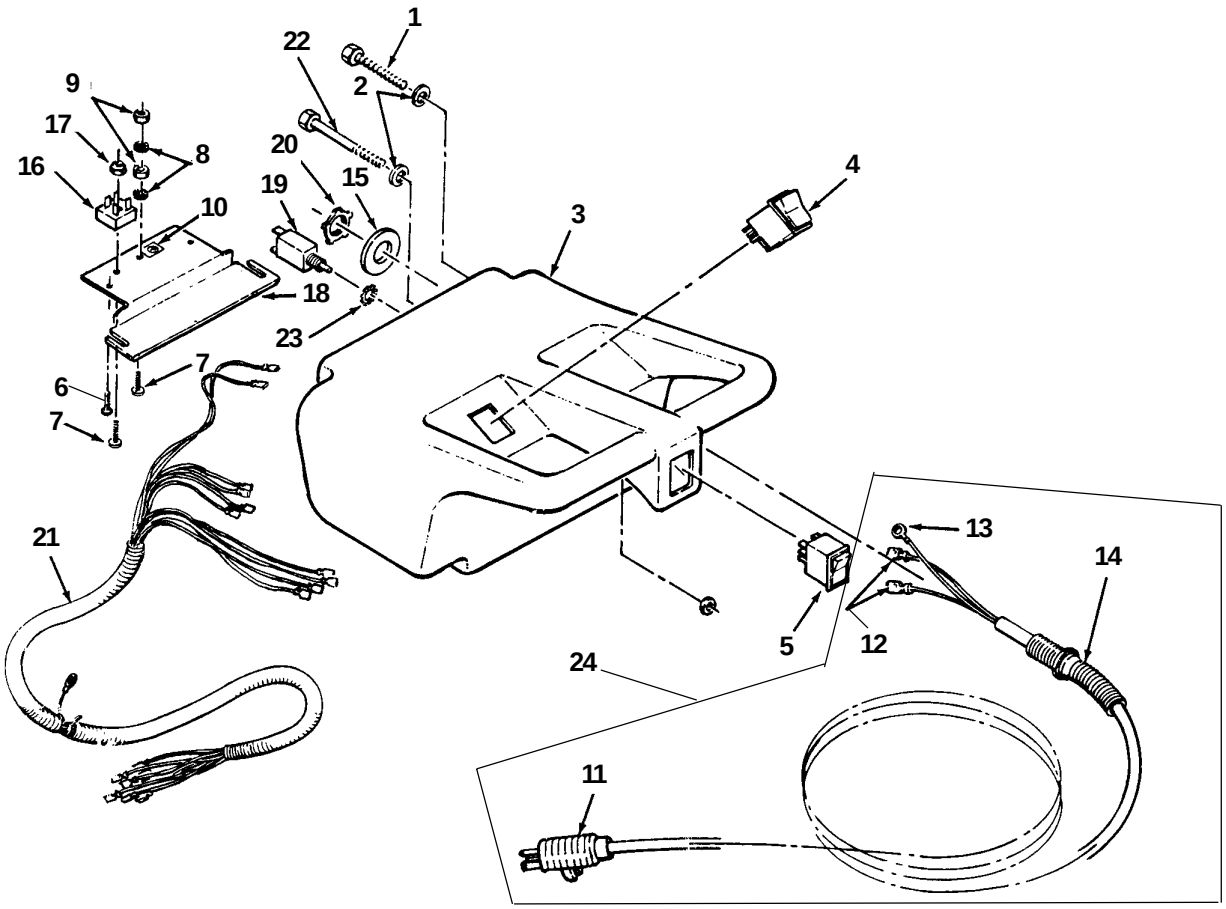
Ref.	Part No.	Description	Qty
1	35231A	Housing, Brush	1
2	980202	Washer, Wave	1
3	52654A	Coupling Male QD	1
4	87026A	Washer ¼, Flat S.S.	1
5	85521A	Screw, 10-24 x ½	1
6	81104A	Nut ¼ -20	1
7	68775A	Plate, Spray S.s.	1
8	58517A	Spacer	1
9	47807A	Terminal, #10 Ring	1
10	925549	Pin, 3/16 x 1½ Roll	1
11	960970	Bolt, Shoulder 3/8 x ½ x 1½	2
12	45022C	Motor, Brush Drive	1
12a	40832A	Brush Carton	2
13	57268A	Pulley	1
14	68666B	Plate, Brush	1
15	84237A	Screw, 10-32 x ½ S.S.	12
16	54880A	Housing, Spray Nozzle	1
17	54339A	Cap w/Seal Assembly	1
17a	30042A	Gasket, Spray	1
18	54155A	Nozzle, #2 x 150	1
19	66970A	Bracket, Brush Retainer	1
20	66188B*	Pivot, Brush	2

Ref.	Part No.	Description	Qty
21	53047A*	Seal	2
22	902648*	Bearing	2
23◆	66187B	Sprocket, 28T	1
24	34273A	Gasket, Brush	1
25	63059A*	Brush, Restoration	1
25a	63060A	Brush, Maintenance	1
26	962628	Screw, Set 8-32 x 3/16	2
27	50909A	Belt	1
28	47701A	Terminal, ¼ FIFQD**	2
29	980603	Washer, #10 Ext. Lock	2
30	920224	Nut, 10-32 Hex	2
31	628382	Spring	1
32	67148B	Rod, Brush Adjustment	1
33	85605A	Screw, 10-24 x ¾ SS	1
34	63071A	Bracket Brush Stop	1
35	85903A	Screw, 10x½	6
36	38404A	Shield, Deflector	1
37	14657A	Kit, Restoration, Brush includes one of:(#20, 21, 22, 25)	Ref
37A	14671A	Kit, Interim Brush includes 1 each of: (# 20, 21, 22, 25a) (ix model only)	Ref
38	30076A	Strainer	1
NI	699202	Cable Tie	2

**FIFQD=Fully Insulated Female Quick Disconnect

*When servicing these items (#'s 21, 22, and 25) see page 26 Brush Maintenance.

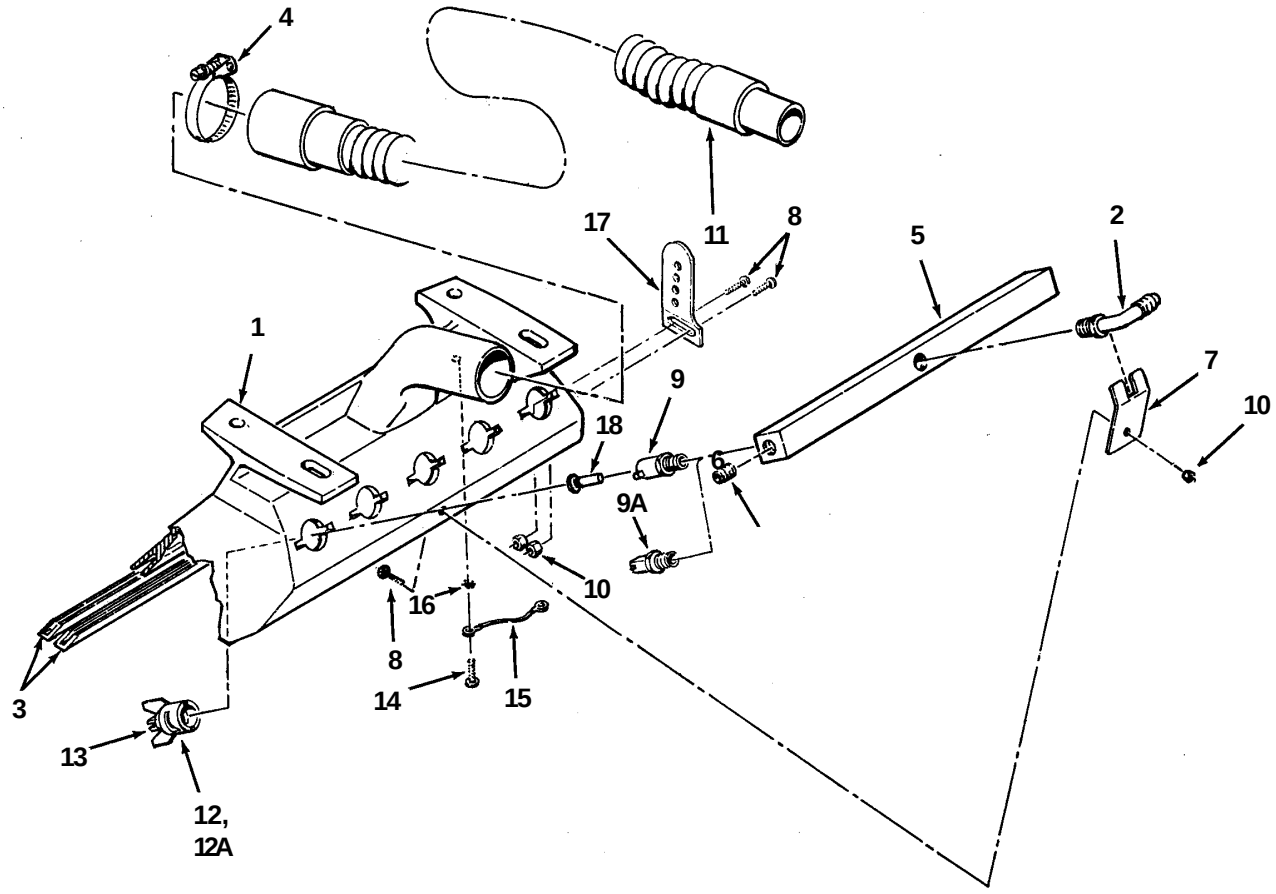
CLARKE TECHNOLOGY Image 16i
Drawing and Parts List, Electric Assembly 5/01
Form #17653A



Ref.	Part No.	Description	Qty
1	85815A	Screw, 5/16" x 1½	2
2	980692	Washer, 5/16" Flat	4
3	34809B	Handle, Control	1
4	47411A	Switch, Vacuum/Accessories	1
5	47412A	Switch, Spray/Brush	1
6	84237A	Screw, 10-32 x ½	2
7	85383A	Screw, 10-32 x ¾	2
8	980603	Washer, #10 Ext. Lock	2
9	920224	Nut, 10-32	2
10	77094A	Label, Ground Symbol	1
11	42188A	Cord, Power 35'	1
12	47711A	Terminal, ¼ FIFQD*	2
13	911933	Terminal, #10 Insulated Ring	1
14	58013A	Strain, Relief	1
15	170870	Washer, 7/8 Flat	1
16	46103A	Rectifier	1
17	920722	Nut, 10-32 Elastic Stop	1
18	68776A	Panel, Electrical	1
19	41435B	Breaker, Brush 1.25 A	1
20	82100A	Lock Nut, ½ Conduit	1
21	49725A	Cord, Harness Machine	1
22	962308	Screw, 5/16" x 18 x 2¼"	2
23	980666	Washer, 3/8 Ext. Star	1
24	40148A	Cord Assembly, 35'	1
NI	699202	Cable Tie	1

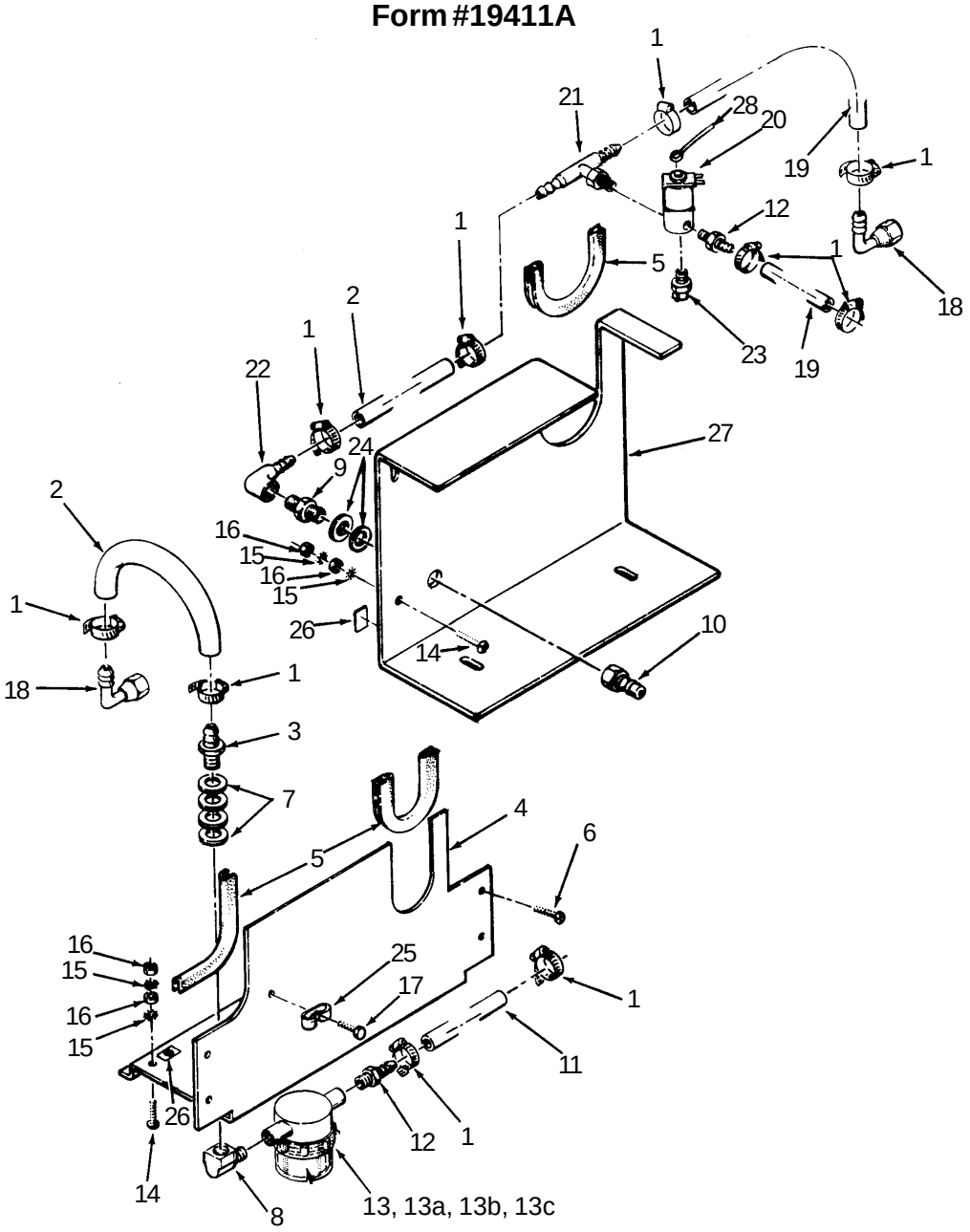
*FIFQD=Fully Insulated Quick Disconnect

CLARKE TECHNOLOGY Image 16i/ix
Drawing and Parts List, Recovery Shoe Assembly 8/00
Form # 19221A/19223A



Ref.	Part No.	Description	Qty	i ix
1	28204B	Shoe, Recovery	1	x x
2	53607A	Elbow, ¼ St	1	x x
3	67615A	Shoe, Recovery S.S.	2	x x
4	872010	Clamp, Hose	1	x x
5	36505A	Manifold, Spray	1	x x
6	696801	Plug, ¼ Recess	2	x x
7	63063A	Bracket, Manifold Retainer	1	x x
8	962798	Screw, 10-24 x ½	3	x x
9	54880A	Housing, Spray	4	- x
9A	54164A	Nozzles 110° x 1.5	4	x -
10	81110A	Nut, 10-24 Nylock S.S.	3	x x
11	30426A	Hose, Recovery	1	x x
12	54339A	Cap w/Gasket Asm.	4	- x
12a	30042A	Gasket, Spray	4	- x
13	54157A	Nozzle, 110° x 1 Brass Q.D.	4	- x
14	962333	Screw, 10-32 x 3/8	1	x x
15	49067A	Wire, Ground	1	x x
16	980603	Washer, #10 Ext. Lock	1	x x
17	63061C	Bracket, Brush Adj.	1	x x
18	30076A	Strainer	1	x x

CLARKE TECHNOLOGY Image 16
Drawing and Parts List, Valve Assembly 5/01
Form #19411A

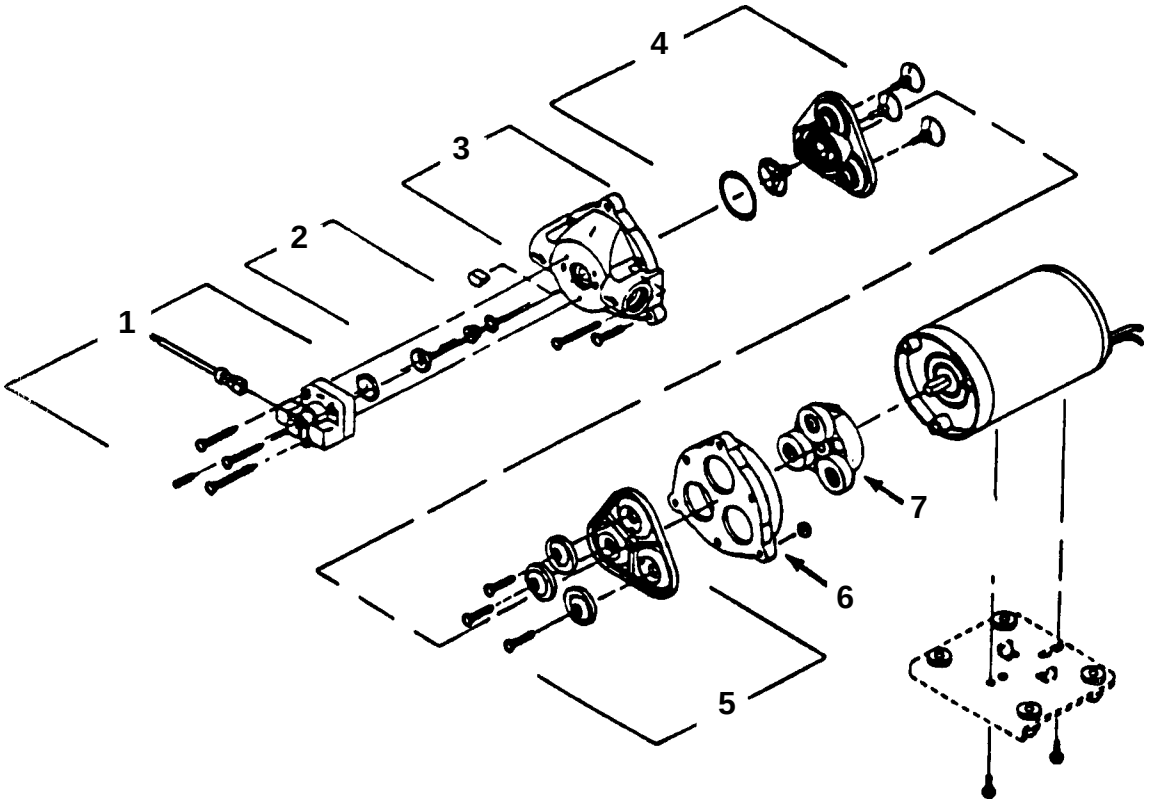


Ref.	Part No.	Description	Qty
1	722030	Clamp, Hose	10
2	30425A	Hose, Air 24"	2
3	170030	Hosebarb	1
4	68665A	Support, Valve	1
5	839204	Trim	3
6	85395A	Screw, ¼-20 x ½	4
7	980410	Washer, S.S.	4
8	170040	Elbow	1
9	697501	Reducer	1
10	737140	Quick Disconnect	1
11	35172B	Hose, 4½"	1
12	53619A	Hosebarb, Nylon	2
13	53050A	Strainer, Bowl (incl. #13a,b, c)	1
13a	58061A	Screen, Filter	1
13b	54369A	Gasket, Viton	1
13c◆	50018A	Bowl, Filter	1
14	85383A	Screw, 10-32	2

Ref.	Part No.	Description	Qty
15	980603	Washer, #10 Ext. Lock	4
16	920224	Nut, 10-32 Hex	4
17	962987	Screw, 10-24 x 3/8	1
18	692870	Elbow, Swivel	2
19	35147A	Hose 14"	2
20	59785A	Valve, Solution Flow	1
21	59016A	Tee	1
22	53617A	Elbow, ¼ NPT x 3/8 Hosebarb	1
23	50328A	Coupling, Female Q.D. shut-off	1
24	170863	Washer, flat 3/8	2
25	302101	Clip	1
26	77094A	Label, Ground Symbol	2
27	68668A	Plate, Rear, Cover	1
28	49068A	Wire, Ground	1

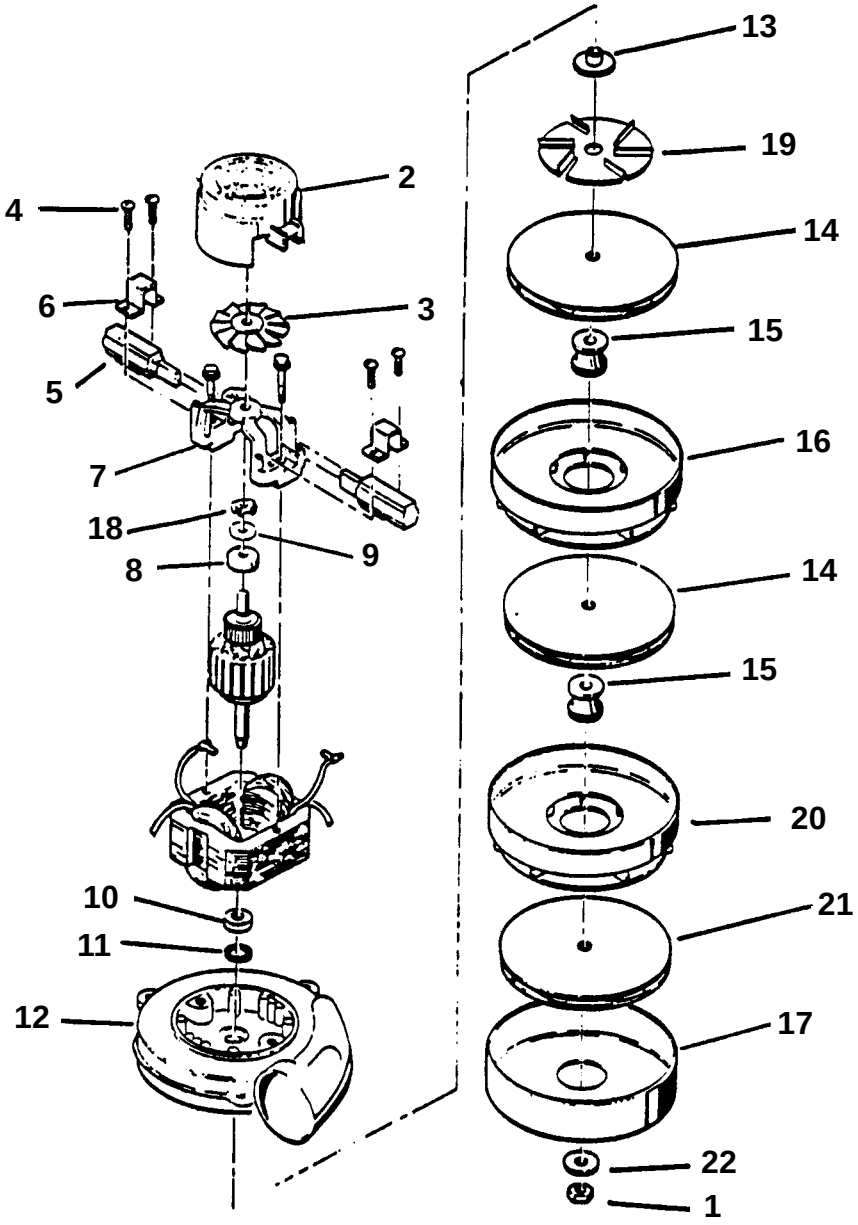
NOTE: ◆ indicates a change has been made since the last publication of this manual.

CLARKE TECHNOLOGY Image 16
Drawing and Parts List 6/95
Pump (#45905C) i model
Pump (45928A) ix model



Ref.	Part No.	Description	Qty	45905C	45928A
1	55372A	Kit, Switch - Viton 80/100psi	1	x	
	53057A	Kit, Switch 80/100psi	1		x
2	55374A	Kit, Dual Check Valves	1		x
	52908A	Kit, Check Valves	1	x	
3	54881A	Housing, Upper	1	x	x
4	55373A	Kit, Valve	1	x	
	59783A	KIt, Valve	1		x
5	53201A	Kit, Diaphragm	1	x	
	53205A	KIt, Diaphragm	1		x
6	54882A	Housing, Lower	1	x	x
7	54837A	KIt, Drive Assembly	1	x	
	52909A	KIt, Drive Assembly	1		x

CLARKE TECHNOLOGY Image 16
Drawing and Parts List 6/95
Motor (#44911R)

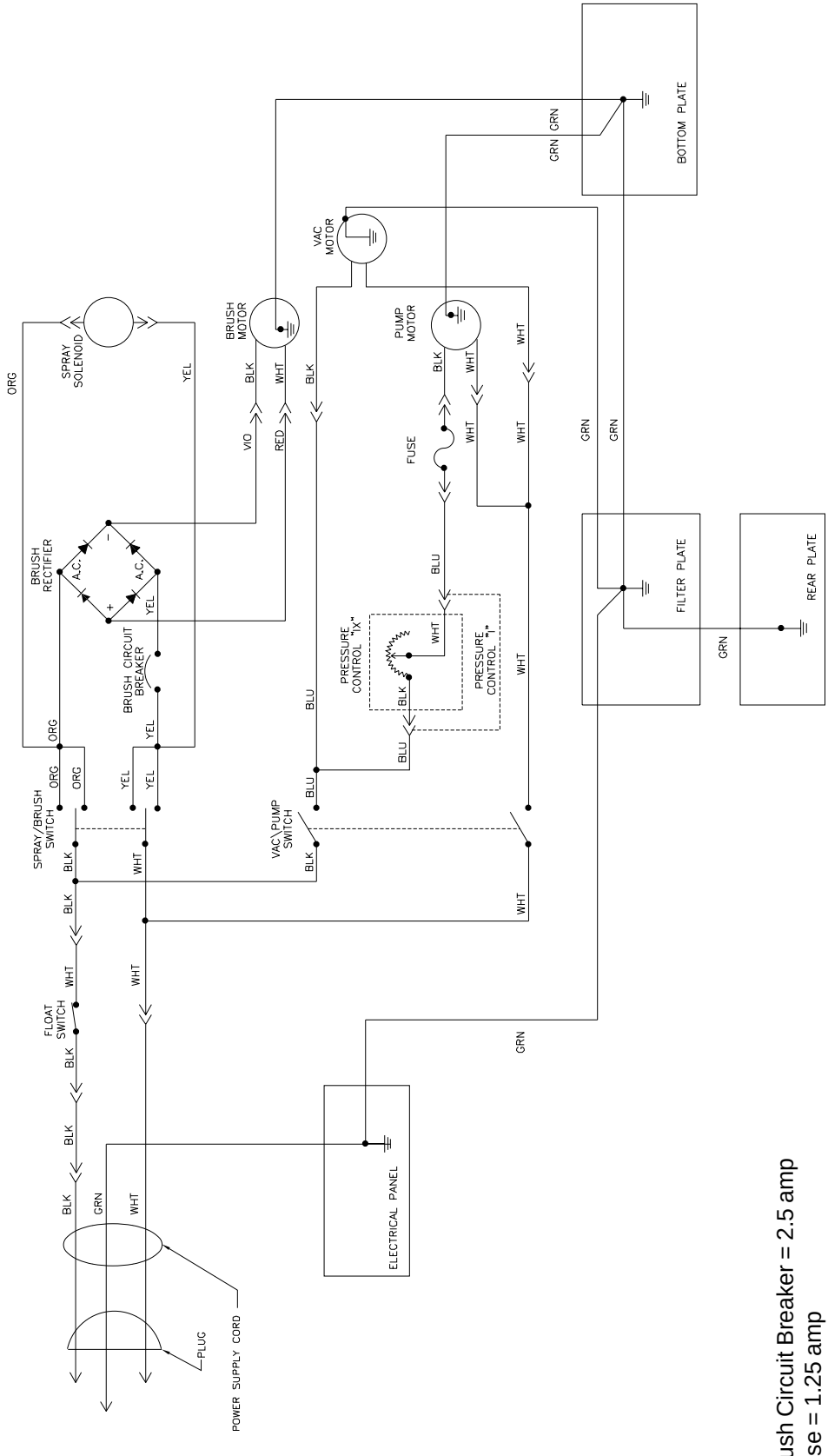


Ref.	Part No.	Description	Qty
1*		Nut	1
2*		Housing Vent	1
3*		Fan	1
4	85303A	Screw, 8-32 x 3/8	4
5	40812A	Brush, Mechanism	2
6	51914A	Clamp	2
7	50618A	Bracket, End, Com.	1
8*		Bearing	1
9	672714	Disc	1
10*		Bearing	1
11*		Washer	1
12*		Bracket, Fan End	1
13*		Spacer	1

Ref.	Part No.	Description	Qty
14*		Fan, Rotating	2
15*		Spacer	2
16*		Fan, Stationary	1
17*		Shell, Fan	1
18	638313	Spring, Load	1
19	53995A	Fan, Air Seal	1
20*		Fan, Stationary	1
21*		Fan, Rotating	1
22*		Washer	1

NOTE: #'s 1,2,3,8,10,11,12,13,14,15,16,17,20,21,22 are not available at this time.

CLARKE TECHNOLOGY Image 16 i/ix
Electrical Schematic 4/99



Brush Circuit Breaker = 2.5 amp
Fuse = 1.25 amp

CLARKE TECHNOLOGY Image 16 i/ix
Connection Diagram 4/99